CCUS in industry

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20+ years of EU support to CCS

- 1996 - First European R&D linked to the Sleipner project
- Framework Programme 4, 5, 6, 7 and Horizon 2020
- EUR 700 million invested in CCS and clean coal R&D
- EUR 1 billion allocated in 2009 through the EEPR (European Energy Programme for Recovery)
New directions for CCUS

• Problematic business case for CCUS in power generation

• Emphasis is shifting from CCS in power plants to CCS in energy-intensive industry such as steel and cement, for which CCS is the only way to further reduce their CO2 emissions

• CCU (CO2 utilisation) in the process industry, such as transforming CO2 into fuels, chemicals and materials, attracts more and more attention

• CCS in hubs and industrial clusters (with decoupling of capture, transport and storage) is probably the best business model
The stakeholder dialogue: the SET Plan

- The SET Plan is the 'technology pillar' of the EU energy policy

- SET Plan countries [EU28 + CH, IS, NO, TR]

- Stakeholder Platforms
  - European Technology and Innovation Platforms, gathering all relevant stakeholders (ZEP):
  - The European Energy Research Alliance (EERA)
  - Other EU Stakeholder platforms active in/relevant to the energy sector (e.g, ECRA, CEMBUREAU).

- Declaration of Intent endorsed by all stakeholders
CCUS Implementation Plan

• Temporary Working Group, chaired by NL and NO, co-chaired by ZEP (Zero Emissions Platform)

• Outlines the R&I activities needed to reach the CCUS targets for 2020-2030 agreed between the European Commission, SET-Plan countries and industry

• Delivery of regional CCUS clusters is a key component:
  • Norway (FEED study to be completed in 2019)
  • UK East Coast, and the harbours of Rotterdam, Le Havre and Marseille (feasibility studies studies to be completed in 2020)

CCUS support under Horizon 2020

• CCUS in industry has been supported in the Calls for Proposals of 2014, 2015 and 2017
  • 5 CCS projects: 3 cement, 1 steel, 1 refinery
  • 2 CCU projects (CO2 to methanol/ethanol)
  • Total budget EUR >100 M, EU contribution EUR 80 M

• Calls 2019 & 2020 earmarks another EUR 58 million
Ongoing projects in Horizon 2020

CEMCAP (2014)

CO2 capture from cement production

Total cost: 10 M€

EU Contribution: 8,8 M€

Coordinator: SINTEF (NO)
Ongoing projects in Horizon 2020

STEPWISE (2014)
SEWGS Technology Platform for cost effective CO2 reduction in the Iron and Steel Industry

Total cost: 13 M€
EU Contribution: 13 M€

Coordinator: ECN (NL)
Ongoing projects in Horizon 2020

LEILAC (2015)
Low Emissions Intensity Lime and Cement
Total cost 20,8 M€
EU Contribution 11,9 M€
Coordinator: CALIX (UK)
Ongoing projects in Horizon 2020

CLEANKER (2017)

CLEAN clinKER production by Calcium looping process

Total costs 9,2 M@

EU Contribution 8,9 M€

Coordinator: Laboratorio Energia Ambiente Piacenza (IT)
Ongoing projects in Horizon 2020

CHEERS (2017)

Chinese-European Emission-Reducing Solutions

Total cost 16.8 M€

EU Contribution 9.7 M€

Coordinator: SINTEF (NO)
Ongoing CCU projects in Horizon 2020

**STEELANOL (2014)**  
Advanced biofuels from steel gases  
Total cost 14,6 M€  
EU Contribution 10,2 M€  
Coordinator: ArcelorMittal

**FReSMe (2016)**  
From residual steel gases to methanol  
Total cost 11,4 M€  
EU Contribution 11,4 M€  
Coordinator: I-DEALS

**MefCO2 (2014)**  
Methanol from captured carbon dioxide using surplus electricity  
Total cost 11,4 M€  
EU Contribution 8,6 M€  
Coordinator: I-DEALS
Horizon 2020 Energy WP 2018-2020

- NZE-1: Pilots for advanced capture technologies (2018)
- NZE-2: Pilots on CO2 conversion to fuels (2018)
- NZE-3: Strategic planning for CCUS deployment (2018)
- NZE-4: Integrated solutions for flexible power plants using power-to-X and energy storage (2019)
- NZE-5: CCS in industry (2019, 2020)
- NZE-6: Geological storage pilots in different settings (2020)
LC-SC3-NZE-5-2019: Low-carbon industrial production using CCS

- Integrating CO2 capture in industrial installations
- Address all aspects, i.e. technical (integration, scalability, purity); safety (transport); financial (cost of capture and integration) and strategic (business models, operation and logistics of clusters and networks)
- Expected EC contribution EUR 10-12 million per project; IA
- Call opens 07 May 2019 with deadline 27 August 2020
Thank you!

More info and Calls for Proposals at the Participant Portal